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Integrated circuit chip card for use in applications such as banking, has board protecting plate and integrated circuit element protecting plate provided in between upper and lower outside plates (Eng)

3B SYSTEM INC 1999.09.10 1999KR-038623

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2000.09.04 2000WO-KR01003 N(AU CN IN JP NZ SG US) R(AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE)

Novelty: The integrated circuit (IC) (2) and coil (3) are installed in between the upper outside plate (5) and the lower outside plate (4). The IC chip card is installed on upper portion of board protecting plate (6) for inserting circuit elements. The plate (6) and integrated circuit protecting plate (7) are provided with holes or grooves (6a,7a) and the size of the plate is same as the size of the IC board.

Use: For use in wide range of application such as banking, to distribution and medical services.

Advantage: The card's durability is increased by removing the protrusion on the plane of the finished integrated circuit chip card. Manufacturing process is very simple using heating and compressing method. The thickness of the whole card is thin and regular, thus preventing unwanted gap between cards.

Description of Drawing(s): The figure shows side view of an integrated circuit chip card.

Integrated circuit 2
Coil 3
Lower outside plate 4
Upper outside plate 5
Board protecting plate 6
Grooves 6a,7a
Integrated circuit protecting plate 7
(16pp Dwg.No.2/4)

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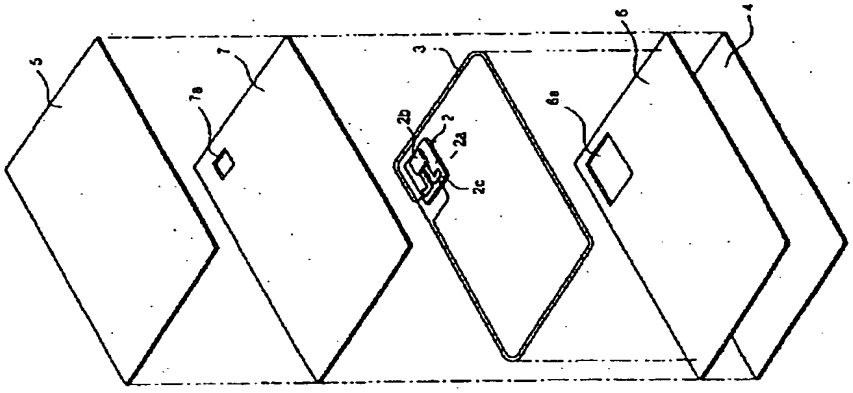
T04-K01; V04-Q02A3



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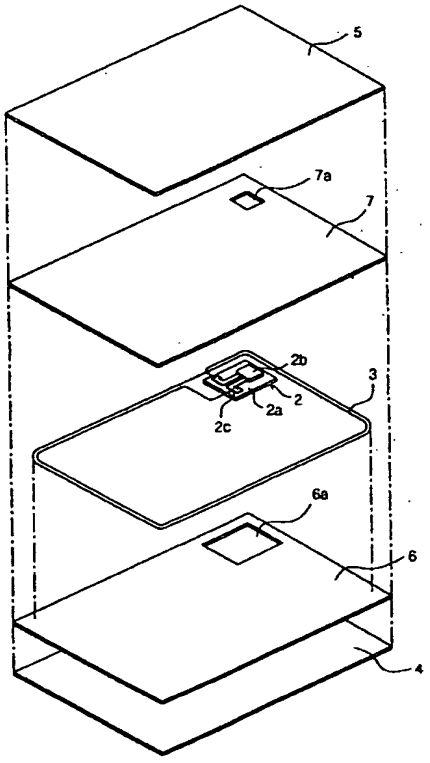
(54) Title: IC CARD AND MANUFACTURING METHOD FOR IC CARD



(57) Abstract: The integrated circuit chip card of this invention is manufactured by installing the board-protecting plate to protect the integrated circuit board (COB, COF, Chip on lead frame) and the circuit element-protecting plate to protect the circuit elements of the integrated circuit in between the lower and the upper outside plates, and by forming a hole or groove for installing the board, the same size as the board on the board-protecting plate where the integrated circuit is located, and by forming a hole or groove for installing the circuit element, the same size as the circuit element on the circuit element-protecting plate where the integrated circuit is located, and then by laying out coils on the board-protecting plate and compressing the lower and the upper outside plates. Therefore, this invention prevents the cut or twist of the coil, made in the course of compressing because the integrated circuit chip card is manufactured by compressing the upper and the lower outside plates without curving the cut-section of coil, and prevents the damage on the circuit elements of the integrated circuit because the protrusion is prevented on the plane of the finished integrated circuit chip card, thus extending the card's durability.

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IC CARD AND MANUFACTURING METHOD FOR IC CARD

FIELD OF THE INVENTION

This invention relates to IC Card and its manufacturing method for preventing any protrusion of the integrated circuit and damages of contact part between the integrated circuit and the coils, extending the card' s durability and reducing manufacturing cost.

BACKGROUND OF THE INVENTION

This integrated circuit chip card with a built-in integrated circuit and various functions is used in a wide range of applications from banking, to distribution and medical services. It has improved memory capacity and security compared to general cards with magnetic tape.

As shown on Fig 4, an existing integrated circuit chip card (50) is composed of a frame which fixes and installs the integrated circuit (53) and the coils (54) in between the upper and lower outside plates (51,52).

For the above integrated circuit (53), the circuit element (53b) is installed on the board (53a) to which the wiring (53c) connected

with the circuit element (53b) is fixed and installed.

The above coils (54) can be formed as manifold winding or cut images for generating more current by the changes of magnetism from the magnetic field.

For the existing integrated circuit chip card, the integrated circuit (52) is arranged on a part of the lower outside plate (51).

The coils (53) and the integrated circuit (52) are installed in between the lower outside plate (51) and the upper outside plate (54) as heating and compressing the upper outside plate (54) and the lower outside plate (51) after connecting winding coils (53) and the integrated circuit (52).

However, there were some problems such as short circuit when the cut-section of the coils located at the edge of the board compresses the upper and the lower outside plates by shearing and tensile force due to the board forming the integrated circuit and the thickness of the circuit element.

As the circuit element of the integrated circuit is protruded from the outside of the finished integrated circuit chip card, the circuit element can be easily damaged when used frequently.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side view of an integrated circuit chip card of this invention;

Fig. 2 is a deal side view of an integrated circuit chip card of this invention;

Fig. 3 is A-A line of cross-sectional view, showing an integrated circuit chip card of this invention and its manufacturing method;

Fig. 4 is A-A line of cross-sectional view of an existing integrated circuit chip card;

<Descriptions of major parts of this invention as shown on the drawings>

1 : Integrated circuit chip card

2 : Integrated circuit

2a : Board

2b : Circuit element

2c : Wiring

3 : Coil

4 : Lower outside plate

5 : Upper outside plate

6 : Board protecting plate

6a : Hole on the board

7 : Circuit element protecting plate

7a : Hole on the circuit element

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 1 and Fig. 2 show the integrated circuit chip card of this invention, and major part 1 on the drawing is the integrated circuit chip card.

Installing the integrated circuit (2) and coil (3) in between the upper outside plate and the lower outside plate, the integrated circuit chip card (1) of this invention includes board protecting plate (6) and the circuit element protecting plate (7) in between the upper outside plate and the lower outside plate.

The above integrated circuit (2) installed on the board (2a) is composed of the circuit element (2b) with 1 body of several transistors, resistance, memory, etc. and the wiring (2c) installed on the board (2a) and connected with the circuit element (2b) for outputting electric signal or supplying weak electricity.

The above coils (3) can be formed as manifold winding or cut

images for generating more current by the changes of magnetism from the magnetic field.

The above board protecting plate (6) installed on the upper part of the lower outside plate (4) forms a hole on the board or a groove (6a), the same size as the board (2a) of integrated circuit (2) on the part where the integrated circuit (2) is located.

It is desirable for the thickness of the board protecting plate (6) to be same as the sum of the board (2a) thickness of the integrated circuit (2) and the protruded thickness of the wiring (2c).

Circuit element protecting plate (7) installed on the upper part of the board protecting plate (6) forms a hole for installing circuit elements and a groove (7a), the same size as the board (2a) of the integrated circuit (2).

It is desirable that the thickness of the above circuit element protecting plate (7) is the same as the height of the circuit element (2b) protruded to the upper part from the board (2a) of the integrated circuit (2).

Each of the board protecting plates (6) where the integrated circuit (2) is located, and the circuit element protecting plate (7) makes a separate hole (6a, 7a), the same size as the board (2a) and

the circuit element (2b).

After installing the above board protecting plate (6) on the lower outside plate (4), the board (2a) of the integrated circuit (2) is inserted into the hole (6a) formed on the board protecting plate (6).

Circuit element protecting board (7) is installed on the board protecting plate (6) by installing tightly wound coils (3) or cut on the board protecting plate (6), sticking the cut-section of the coils (3) to the wiring (2c) of the integrated circuit (2) and inserting the circuit element (2b) of the integrated circuit (2) into the hole or groove (7a) formed on the circuit element protecting board (7) of the board protecting plate (6).

The integrated circuit chip card (1) is manufactured by installing the upper outside plate (5) on the circuit element protecting board (7) and compressing the lower outside plate (4) and the upper outside plate (5).

Even though the integrated circuit chip card (1) can be manufactured easily by applying an adhesive on the contact surfaces of the upper outside plate (5) and the lower outside plate (4), the board protecting plate (6) and the circuit element protecting board (7) compress together, allowing it's thickness to increase.

It can be simply manufactured using synthetic resins as materials for the upper outside plate (5) and the lower outside plate (4), the board protecting plate (6) and the circuit element protecting board (7) by heating and compressing method.

Therefore, the integrated circuit chip card and its manufacturing method of this invention can protect the integrated circuit, removing the protrusion caused by the integrated circuit of the finished card.

UTILITY

The integrated circuit chip card and its manufacturing method of this invention can prevent the cut or twist of the coil, made in the course of compressing the upper and the lower outside plates without curving the cut-section of coil.

Also by removing the protrusion on the plane of the finished the integrated circuit chip card, the card' s durability can be extended.

More advantages are as follows.

The thickness of the whole card is thin and regular compared with existing cards and space occurring due to the protrusion part of the inner card and margins of cards or extreme separation are prevented.

WHAT IS CLAIMED IS:

1. For the integrated circuit chip card, which the integrated circuit and the coils composed of board, circuit element and wiring are installed in between the lower and the upper outside plates,

the board protecting plate installed on the upper part of the lower outside plate forms a hole or a groove on the board, the same size as the board of the integrated circuit on the part where the integrated circuit is located.

The integrated circuit chip card installed on the upper part of the board protecting plate for inserting the circuit element of the integrated circuit includes the integrated circuit protecting plate which forms a hole for installing the circuit element and a groove, the same size as the board of the integrated circuit.

2. For claim 1,

as far as the thickness of the board protecting plate, this integrated circuit chip card features its allowable margin and thickness of this integrated circuit board within 0 ~ 0.1 mm.

3. For claim 1 or claim 2,

as far as the thickness of the board protecting plate, this integrated circuit chip card features its allowable margin between the thickness of the board of the integrated circuit and the sum of protruded thickness of wiring within 0 ~ 0.15 mm.

4. For claim 1,

as far as the thickness of the circuit element protecting plate, this integrated circuit chip card features its allowable margin and height of the protruded circuit element to upper part on the integrated circuit within 0 ~ 0.1 mm.

5. For this integrated circuit chip card which the integrated circuit protecting plate protecting the circuit element of the integrated circuit and board protecting plate protecting the board of the integrated circuit are installed in between the upper and the lower outside plates,

the integrated circuit chip card is manufactured by forming a separate hole or groove, the same size of the board and the circuit element,

inserting the board of the integrated circuit into the hole formed on

the board protecting plate after installing the above board protecting plate on the lower outside plate,

installing tightly wound coils or cut on the board protecting plate,

sticking the cut-section of the coils to the wiring of the integrated circuit inserting the circuit element of the integrated circuit into the hole or groove formed on the circuit element protecting board of the board protecting plate,

installing the upper outside plate on the circuit element protecting board and compressing the lower outside plate and the upper outside plate.

FIG. 1

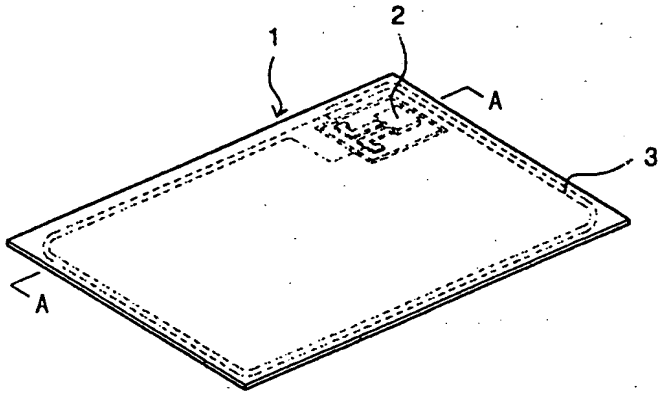


FIG. 2

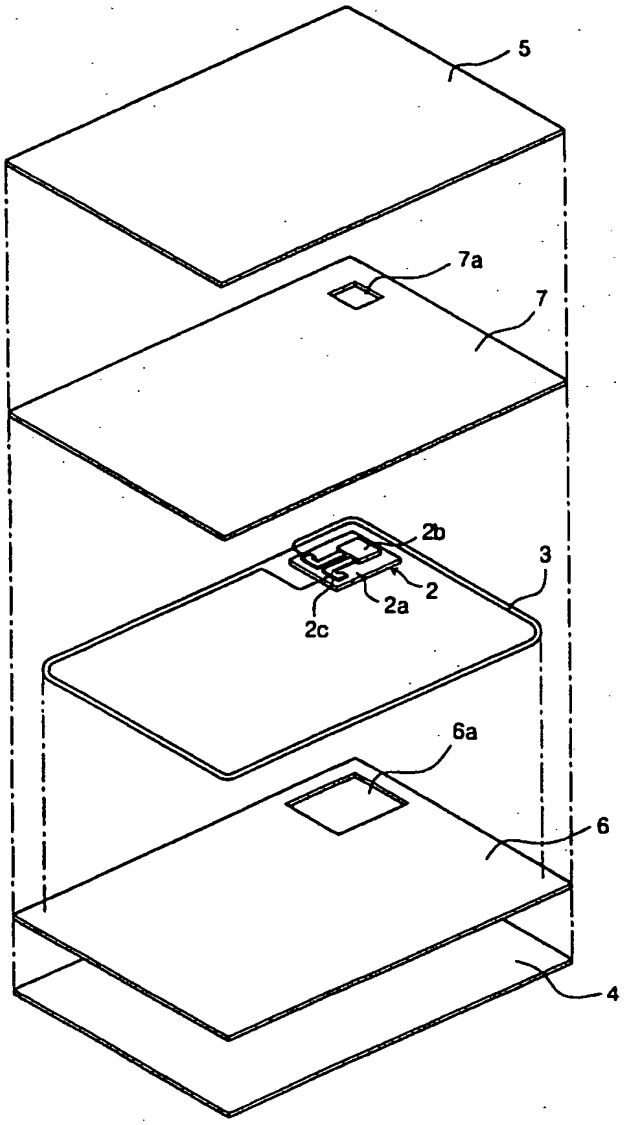


FIG. 3

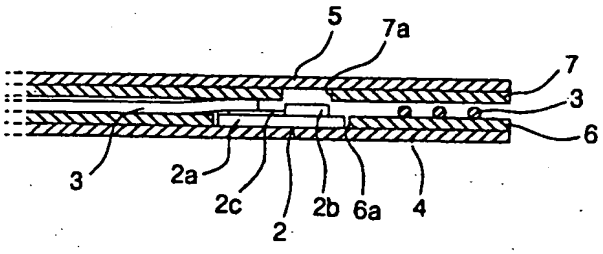
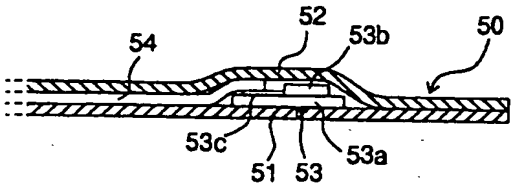


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR00/01003

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 G06K 19/077

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)
G06K

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched
Korean Patents and applications for invention since 1975
Japanese Patents and applications for invention since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)
KIPOnet, "manufacture and card and (hole or groove or hollow or cavity or aperture)"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 10-278458 A (TOPPAN PRINTING CO.) 20 OCTOBER 1998	1, 5
Y	JP 8-96090 A (TOSHIBA CORP.) 12 APRIL 1996	1 ,5

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevence
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"P" document published prior to the international filing date but later than the priority date claimed
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"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 DECEMBER 2000 (28.12.2000)	28 DECEMBER 2000 (28.12.2000)

Name and mailing address of the ISA/KR
Korean Industrial Property Office
Government Complex-Taejon, Dunsan-dong, So-ku, Taejon
Metropolitan City 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

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JEON, Han Chul
Telephone No. 82-42-481-5790

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR00/01003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 10-278458(A)	20.10.1998	NONE	
JP 8-96090(A)	12.4.1996	NONE	